

Desain dan analisa struktur Yoke Mooring Tower untuk Floating Storage Offloading (FSO) = Design and analysis of Yoke Mooring Tower structure for Floating Storage Offloading (FSO)

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Abstrak

Floating Storage Offloading (FSO) adalah anjungan terapung yang berfungsi sebagai fasilitas penyimpanan produksi minyak atau gas alam sebelum didistribusikan dengan kapal tanker. FSO ditambatkan pada mooring tower dengan tujuan menjaga FSO agar stabil dan relatif tetap pada posisinya sehingga aspek operasional FSO dapat tetap berjalan lancar. Mooring tower dipilih sesuai dengan keadaan Laut Jawa yang tergolong relatif dangkal. Tugas akhir ini bertujuan untuk menentukan desain mooring tower yang mampu menahan beban lingkungan struktur serta beban tarikan vessel FSO. Perangkat lunak Structural Analysis Computer System (SACS) dipergunakan sebagai alat bantu permodelan dan perhitungan.

Analisa statis (in-place analysis) dilakukan pada mode operasional dan ekstrim terhadap tiga tipe struktur dengan perbedaan geometri pada perangkaan diagonal: tipe struktur perangkaan diagonal tunggal (tipe struktur I); tipe struktur perangkaan diagonal X (tipe struktur II); dan tipe struktur perangkaan diagonal V (tipe struktur III), untuk menentukan desain yoke mooring tower paling baik.

Hasil analisa menunjukkan ketiga tipe struktur telah memenuhi kriteria unity check (UC). Berdasarkan kriteria UC ini, tipe struktur II cenderung lebih baik dibandingkan tipe struktur lainnya. Namun mempertimbangkan faktor berat, desain tipe struktur I akan digunakan sebagai desain yoke mooring tower karena memiliki berat paling ringan diantara ketiganya.

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<i>Floating Storage Offloading (FSO) is a floating structure that serves to receive and store oil or natural gas before distributed by shuttle tankers. FSO is moored to a mooring tower to stabilize its position in order to maintain the operational aspect of the FSO. Mooring tower is selected in accordance with the state of Java Sea which is relatively shallow. The objective of this final paper is to design a yoke mooring tower that able to resist its environmental loading and FSO tension. Structural Analysis Computer System (SACS) is the software used to model and to solve the calculation.

An in-place analysis is conducted on operational and storm conditions on three type of structures with geometrical differences on its diagonal bracing: single diagonal bracing (type I); type X diagonal bracing (type II); and type V diagonal bracing (type III), to choose the best design for a mooring tower structure.

The result shows that each structure type meets the unity check (UC) requirements for in-place analysis. Further analysis presents that structure type II considered as a better structure with regard to UC values. But putting the structure self-weight itself into consideration, the best structure design to be applied as a mooring tower in the proposed location would be structure type I since this structure is the lightest.</i>